

APPENDIX B

CASE STUDIES OF TIME RELEVANT PROJECTS

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Office of Air and Radiation: Ozone Mapping Project, AIR NOW

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Location: Research Triangle Park, North Carolina
Date Implemented: 1996; Operates seasonally from mid-May through September

Element of Success: This project demonstrates how an easy-to-understand Web interface (e.g., animated ozone maps, plain-English interpretation) produces effective public data dissemination.

Project Description

The goal of the ozone mapping project continues to be the creation of accurate and easy to understand ozone maps for distribution on the World Wide Web and use during television weather reports. For 1998, the objectives of this project are to enhance the Ozone Mapping System (OMS) such that it is:

- Capable of integrating hourly ozone data on a daily basis from monitors throughout the Northeast States for Coordinated Air Use Management (NESCAUM) region, Mid-Atlantic Regional Air Management Association (MARAMA) region, and mid-west areas;
- Flexible enough to accommodate future changes within the ozone monitoring network and include additional monitors which may improve the accuracy of ozone mapping, particularly near map boundaries;
- Allows users to easily display maps at geographic scales ranging from individual metropolitan areas to the entire eastern-half of the United States, and flexible enough to allow mapping of other pollutants if desired.

Evaluation of Technology

This is a sophisticated project with a high degree of automation to deliver data to the public via the Web in a time-relevant manner. The Automated Data Transfer System (ADTS) converts data from a participating agency's native format to a standard format, transfers data from a State Host Computer (SHC) to a Data Collection Center (DCC) and performs quality assurance checks on data. The Map Generation System (MapGen) accesses the data from the ADTS and generates suitable maps and animations. The Data Distribution System (DDS) makes data and images available to participating agencies, TV stations and Weather Service Providers. This project is staffed by well trained technical people and all aspects are well documented.

Lessons Learned

- The need for an “accounts manager.” This person would have overall knowledge of the project and would be mostly involved in planning and testing of the project’s system.
- The need for an “applications deployment checklist.” Determine and document the types of connections needed to execute the project.
- Determine the minimum requirements for making data available to the public.
- The difficulty of accessing other entities’ data (e.g., state ozone data). AIRNOW solved this issue by providing a value-added product (i.e., ozone maps) in exchange for the state’s ozone data.

Project Initiator	Ozone Mapping Project, EPA
Project Description	The goal of the ozone mapping project is the creation of accurate and easy to understand ozone maps for distribution on the World Wide Web and for use during television weather reports.
Status	Operational.
Environmental Data Collected	Ozone concentration in parts per billion (ppb).
Real Time/Time-Relevant	Real Time.
Frequency of Update	2-7 times per day (depending on location). 1.5-2 hour between data collection to delivery.
System Architecture	
Hardware	State Host Computers (SHC) - pentium PCs. Data Collection Centers (DCC) - Custom UNIX workstations running on an OIRM DEC Alpha platform.
Software	State Host Computers - Windows 95, FTP server, spreadsheet, image viewer, Tcl/Expect. Map Generator 1.0 (MapGen)--image display system.
Web Connectivity/Interface	Direct Internet Connection. 12-28.8 Kbaud Modem, Hayes compatible. Established Web site: http://www.epa.gov/airnow/ Animated maps (.gif format) with color-coded ozone values incremented hourly. Static images of daily peak ozone values.

Data Management	
Metadata	
Environmental Data Registry (EDR)	Registering ozone concentration in parts per billion (ppb) and geographic station location (lat and long). Currently (as of Project Plan submission) not registered; AIRS administrators, or the OMS contacts will register these elements soon.
QA/QC	Stage 1 automated. Stage 2 visual inspection by System Administrator in accordance with Standard Operating Procedures.
Data Security	Security Plan implemented; Security Officer appointed.
Data Storage/Archiving	Data Collection Center.
Secondary Data Users	
Forecasting Capabilities	Currently forecasting next-day peak ozone levels for Northeast states. Planning to expand capability.
Other Communications	Newspapers, TV, environmental 'kiosks' (future)
Partners	Regions Northeast States for Coordinated Air Use Management (NESCAUM). Ozone Transport Commision (OTC). Mid-Atlantic Regional Air Management Association (MARAMA). Lake Michigan Air Directors Consortium (LADCO). State and Territorial Air Pollution Program Administrators/Association of Local Air Pollution Control Officials (STAPPA/ALAPCO). Sevaral State Agencies.

Contra Costa County Bucket Brigade Project

Primary Contact: Patty Monahan, EPA Region 9, Toxics Section
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Location: Contra Costa County, California

Date Implemented: Summer 1998

Element of Success: Bucket Brigade demonstrates an innovative way to monitoring, specifically the type of monitors used. As the name suggests, air samples are collected into five gallon paint buckets that have been modified to accurately collect air samples. Also, the project depends on volunteers to collect the samples and has had to train them to perform this both timely and accurately.

Project Description

The objective of this community-based air sampling project is to provide timely and accurate information regarding air quality in Contra Costa County. The focus of such efforts is the air quality in the vicinity of industrial facilities, especially in the wake of pollution incidents at these facilities. The project also seeks to increase the level of expertise concerning air quality information and the health impacts of exposure to air toxics. The Bucket Brigade Project is currently in the early stages of development and hope to be in full operation by the Fall of 1998. Access to this time-sensitive information will support local decision-makers in responding to air toxics hazards following industrial releases.

Evaluation of Technology

This is a small project with limited resources that is being directed by a grass-roots organization, Community for a Better Environment (CBE). Currently, data is being generated at a local laboratory and placed in a simple spreadsheet. CBE has identified FileMaker as the database software to store future air toxics data, because of the software's Web interfacing capabilities.

Lessons Learned

- Use your resources wisely and employ existing features within the organization.
- The project is mostly relying on volunteers for data collection. Because of this, many issues were raised and had to be addressed, such as safety, quality assurance, security, timeliness, and motivation. Therefore, a project with similar data collection methods should heed that many questions arise from it.
- Stay within your means -- an applicable lesson to smaller EMPACT projects.

Project Initiator	Community for a Better Environment (CBE) San Francisco
Project Description	To provide timely and accurate information on air quality to communities concerned about the human health impacts of exposure to air toxics.
Status	Operational
Environmental Data Collected	Air toxic emissions in ppm, ppb
Real Time/Time-Relevant	Time-relevant; related to incidents
Frequency of Update	At least 25 samples per year, depending on frequency of accidental releases. Data will be available from one week to one month after sampling.
System Architecture	
Hardware	PC computers
Software	Windows NT, Office 97 FileMaker
Web Connectivity/Interface	Commercial Internet Service Provider (ISP) Currently do not have the knowledge or resources to design and develop a web site for the project. Looking for assistance from EMPACT.
Data Management	
Metadata	Currently developing metadata specifications.
Environmental Data Registry (EDR)	Compounds and their associated units (benzene, toluene, xylene, halogenated hydrocarbons, tetrachloroethylene, ketone, sulfides)
QA/QC	Working with EPA's Richmond laboratory and Region 9 QA staff
Data Storage/Archiving	Currently, no such plan is in place. The data is simply stored on a PC computer's hard drive at a laboratory.
Data Security	Working with EPA's Richmond laboratory and Region 9 QA staff.

Secondary Data Users	None identified.
Forecasting Capabilities	No
Other Communications	Public meetings, outreach to public schools and libraries, community accessible database.
Partners	Analytical Laboratory, Contra Costa County Health Services Department, Regional Accident Prevention (RAP) coalition.

Real-Time Monitoring and Reporting of Water Quality for the Charles River and Boston Harbor

Primary Contact: Matthew Leibman, Region 1
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Location: Boston, MA
Date Implemented: FY 1998

Element of Success: This project has been effective in reaching a broad, multilingual audience by posting beach and river advisories on two individual Web sites and through flagging, signage, telephone hotlines, newspapers, and local radio and television broadcasts.

Project Description

This project provides bacterial water quality information about the Charles River (CR) and Boston Harbor (BH), both of which are affected by water-borne pathogens derived from illegal sewer connections, storm water, and poorly treated sewage. CR samples are collected and analyzed daily at stations located at the boathouses, bridges, and beaches in the lower Charles River basin. BH samples are collected weekly at 38 sites along 20 beaches. The public is informed of water conditions through a variety of media and multilingual approaches. These include the Internet, flagging, signage, telephone hotlines, newspapers, and local radio and television broadcasts.

Evaluation of Technology

This project represents an enhancement of existing monitoring efforts in the CR and BH areas, including those by the Boston Harbor Water Quality Task Force and the Clean Charles River 2005 Initiative. In addition to using traditional membrane filtration methods, the CR/BH monitoring project will field test the new EPA Method 1600 for Enterococcus and evaluate the use of PCR (polymerase chain reaction) as tool to enumerate bacterial indicators in less than half the time of traditional methods. CR and BH water quality information are displayed on separate Web sites. CR information is displayed on the Charles River Watershed Association (CRWA) Web site at <http://www.crwa.org/data/flagging/flagindex.htm>. BH information is found on the Shore.net Web site at <http://www.shore.net/shore/beach/quality/>. Both incorporate graphics of blue and red flags to indicate whether respective beaches and rivers are suitable for swimming, boating, etc. The CRWA Web site additionally provides a downloadable Excel file of actual bacteria data collected every week day since May 1998.

Lessons Learned

- Provide advisories, not closures. Communicate the concepts of public health risks to bathers and boaters based on indicator measurements. Communicate the results of

ongoing monitoring without alarming the public.

- Capitalize on existing monitoring and communication methods with the Boston Harbor Water Quality Task Force and the Clean Charles River 2005 Initiative.

Project Initiator	EPA Region 1
Project Description	This project bacterial water quality information about the Charles River (CR) and Boston Harbor (BH), both of which are affected by sewage derived pathogens from illegal sewer connections, storm water, and poorly treated sewage. It represents an enhancement of existing monitoring efforts in the CR and BH areas, including those planned by EPA Region 1.
Status	Operational
Environmental Data Collected	Fecal coliform and Enterococcus
Real Time/Time-Relevant	Real-Time
Frequency of Update	CR is sampled 5 times a week with flags posted on the Internet and on-site. BH is updated once a week prior to the start of the weekend.
System Architecture	
Hardware	
Software	
Web Connectivity/Interface	CR information is displayed on the CRWA Web site at http://www.crwa.org/data/flagging/flagindex.htm . BH information is found on the Shore.net Web site at http://www.shore.net/shore/beach/quality/ . Both incorporate graphics of blue and red flags to indicate whether respective beaches and rivers are suitable for swimming, boating, etc. The CRWA Web site additionally provides a downloadable Excel file of actual bacteria data collected every week day since May 1998.
Data Management	

Metadata	
Environmental Data Registry (EDR)	
QA/QC	CRWA will perform quality assurance to ensure that only correct data are entered into computer databases, and the Internet.
Data Security	
Data Storage/Archiving	CR data to be archived at CRWA. BH data to be stored at MDC.
Secondary Data Users	
Forecasting Capabilities	
Other Communications	On-site flagging; On-site personal contact; PSAs from local radio and television stations; Newspaper; Telephone hot-line. Emphasis on providing announcements in several languages.
Partnerships	Metropolitan District Commission (MDC) Charles River Watershed Association (CRWA) The Boston Harbor Association (TBHA) Virginia Institute of Marine Sciences (VIMS) Massachusetts Water Resources Authority (MWRA) Massachusetts Department of Environmental Protection (MA DEP)

Chesapeake Bay Program (CBP): Water Quality Monitoring

Primary Contact: Douglas Norton, OWOW
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Location: Annapolis, MD

Date Implemented: May 18, 1998

Element of Success: The CBP has developed thorough metadata reporting approaches that are applied to all of the data they collect. They also perform weekly calibrations of the monitoring stations. Further, the CBP employs emerging technologies, such as Cold Fusion, a Web-based software application that can query any relational database and can execute SQL commands.

Project Description

The time-relevant water quality project at the Chesapeake Bay Program was developed to supplement the State of Maryland's efforts in *Pfiesteria* monitoring. The goals of this project are to:

- Archive and display time-relevant water quality parameters on the Internet for presentation and interpretation of the data to the general public. Share this information via "hot-links" for posting at the following Web sites: Chesapeake Bay Program, EPA's "Surf Your Watershed", and Maryland's Department of Natural Resources (DNR);
- Demonstrate government response to water quality issues of concern to the public;
- Supplement Maryland DNR efforts to characterize water quality conditions in estuarine systems that have experienced or have the potential to experience harmful algal blooms; and
- Supplement Maryland's rapid response and water and habitat quality assessments of the State's tributaries that have a potential risk for harmful algal blooms during 1998.

Evaluation of Technology

This project has been greatly simplified because of its modest size and because it utilizes many of the efforts already in place at the Chesapeake Bay Program. Because there are only two monitoring stations, the data is simply emailed to the QA/QC officer who runs numerous checks on the data. Metadata that is compliant with the FGDC is then generated. The data is posted on the Web in graphical format and will be accessible in numeric tables in the near future.

Lessons Learned

- Generate metadata for all data to ensure accurate storage and delivery of data.
- Invest in upfront QA/QC procedures (i.e., in the field procedures).
- Identify your main audience and ensure that information is communicated online in a manner that is consistent with their technical capabilities.

Project Initiator	Chesapeake Bay Program (CBP)
Project Description	From May 18 to September 15, the project delivers hydrologic data in order to provide an understanding of environmental factors that contribute to the occurrence of harmful algal blooms. This data will also help Maryland's efforts for <i>Pfiesteria</i> monitoring.
Status	Operational
Environmental Data Collected	Continuous--Water temperature, salinity, DO. Weekly--Chlorophyll-a, nutrients, water column respiration.
Real Time/ Time-Relevant	Time-Relevant
Frequency of Update	Delivering data, via the Internet, every 7-10 days for high-frequency water temperature, salinity, and Dissolved Oxygen; every 21 days for chlorophyll-a, nutrients, and water column respiration.
System Architecture	
Hardware	DEC Alpha 3800 Variety of SUN, Data General, and Alpha PC workstations.
Software	YSI field monitor software SQL, Oracle QuatroPro, WordPerfect Cold-Fusion
Web Connectivity/Interface	EPA backbone. Currently showing static graphs of hydrologic data with accompanying text interpretation. Plan to use Cold Fusion to allow users to execute queries on any available data.
Data Management	
Metadata	CBP Metadata Reporting Guidelines. Metadata accompanies all data generated by the CBP with metadata that is compliant with FGDC.

Environmental Data Registry (EDR)	Registering water temperature, salinity, DO, chlorophyll.
QA/QC	Initial check of data in the field. Full-time QA/QC Officer that performs thorough QA/QC on the data before it is publicly available.
Data Security	
Data Storage/Archiving	Raw data is archived on the CBL fileserver with metadata attached.
Secondary Data Users	Maryland Department of Natural Resources; used to supplement the <i>Pfiesteria</i> monitoring program.
Forecasting Capabilities	No
Other Communications	None presently
Partners	Maryland Department of Natural Resources University of Maryland-College Park

Community Based Environmental Lead Assessment and Educational Demonstration Program

Primary Contact: Robert Maxfield, Region 1, Office of Environmental Measurement
and Evaluation
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Location: North Dorchester in greater Boston, MA

Date Implemented: Spring 1998

Element of Success: This project uses an innovative approach to monitoring by offering “on-the-spot” sampling and analysis of soil in homeowner’s yards through the use of a state-of-the-art hand held X-ray fluorescence spectrometer.

Project Description

The primary goal of this pilot project is to reduce the risk of lead exposure to pre-school children in an area of Boston’s inner city having the highest density of lead poisoning cases among children. Through community outreach and awareness, EMPACT partners are providing real-time, door-to-door sampling and analysis of soil in 50 contiguous residential yards, using a state-of-the-art hand held X-ray fluorescence spectrometer. Properties with lead contaminated soils in the range of 400-5000 ppm are mitigated using low cost/no cost abatement landscaping materials and techniques. Two long-term goals are to (1) build a template or guidance document for use in organizing similar projects within other affected inner city communities, and (2) to reduce the incidence of elevated blood lead in the community.

Evaluation of Technology

This project is real-time in that participating homeowners/residents can be notified about the level of lead contamination in their yard and educated about subsequent low cost strategies to mitigate exposure to their children during the course of one visit. State-of-the-art hand held X-ray fluorescence spectrometers help make this possible. All soil monitoring results are stored in a database and displayed using a geographic information system. Landscape designers rely on the GIS maps during the mitigation process. Plans are underway to make this data web accessible.

Lessons Learned

- Community outreach is critical in gaining homeowner/residents buy-in to participate in program
- Increased community awareness and education helps to reduce exposure from many other sources of lead poisoning not targeted in this project.

Project Initiator	EPA Region 1, Office of Environmental Measurement and Evaluation
Project Description	The primary goal of this pilot project is to reduce the risk of lead exposure to pre-school children in a suburb of Boston with the highest density of lead poisoning cases among children. Through community outreach and awareness, EMPACT partners are providing real-time, door-to-door sampling and analysis of soil in 50 contiguous residential yards, using a state-of-the-art hand held X-ray fluorescence spectrometer. Properties with lead contaminated soils in the range of 400-5000 ppm are mitigated using low cost/no cost abatement landscaping materials and techniques.
Status	Operational. Currently, approximately 16 properties have been sampled and 13 redesigned.
Environmental Data Collected	Concentration of lead in soil (ppm)
Real Time/Time-Relevant	Real-time, on the spot analysis of lead in residents/homeowners' soil
Frequency of Update	
System Architecture	
Hardware	Pentium PC
Software	EJ Spatial Analysis Tools with streamlined interface for ArcView
Web Connectivity/Interface	Spatial data from soil monitoring results not yet web accessible.
Data Management	
Metadata	
Environmental Data Registry (EDR)	
QA/QC	A second type of X-ray fluorescence spectrometer is used as a backup during field tests. EPA also to provide backup and QA analysis where necessary.

Data Security	
Data Storage/Archiving	Lead data is archived in a database at BSHC.
Secondary Data Users	
Forecasting Capabilities	
Other Communications	Door-to-door outreach; Community block meetings; Flyers, brochures, and other written materials.
Partnerships	New England Regional Laboratory (NERL) Boston University (BU) Bowdoin Street Health Center (BSHC) Garden Futures

Marine Environmental Monitoring Network for Long Island Sound

Primary Contact: Mark Tedesco, EPA Long Island Sound Office
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Location: Long Island Sound. Project will focus on Bridgeport, CT, but will also serve customers in the New York and Connecticut portions of the New York metropolitan area and in Hartford, CT.

Date Implemented: Project to be operation in FY 1999

Element of Success: The Long Island Sound project established a steering committee composed of key partners and stakeholders to guide the development of the project and to increase community awareness and buy-in for when overall coordination of the project is eventually transferred to the Connecticut coastal stakeholders at large.

Project Description

The goal of the project is to provide comprehensive, time-relevant marine water quality monitoring data on Long Island Sound (LIS) and its harbors and estuaries, to all organizations and individuals having a need for this information. Data will be collected from four buoys to be deployed in the vicinity of New London and Bridgeport, CT and then analyzed, supplemented, and integrated with existing Federal/state water monitoring data collection. Public access to the data and information will be provided via a web site to be hosted at the University of Connecticut (Avery Point) as well as through PSAs from local radio and television stations.

Evaluation of Technology

This project is expected to be operational in FY 1999. Currently, one buoy has been deployed and a second one is to be launched in early September. The buoys will be equipped with surface and sub-surface sensors. Data is transmitted via radio telemetry and telemetry/land line links. University of Connecticut (Avery Point) receives and stores the data, which at present is being stored in a spreadsheet.

Lessons Learned

- Establish a steering committee composed of key partners and stakeholders. Steering committee provides guidance, increases awareness, and facilitates buy-in.
- Capitalize on existing monitoring and communication methods. Long Island Sound study, which predates EMPACT by two years, has already precipitated Federal and state agency monitoring programs, university-based research studies, routine public health monitoring by municipalities, and citizens' volunteer monitoring efforts being developed by private companies.

Project Initiator	EPA Region 1
Project Description	The goal of the project is to provide comprehensive, real-time marine water quality monitoring data on Long Island Sound (LIS) and its harbors and estuaries, to all organizations and individuals having a need for this information. Data will be collected from four buoys to be deployed in the vicinity of New London and Bridgeport, CT and then analyzed, supplemented, and integrated with existing Federal/state water monitoring data collection.
Status	Project to be operation in FY 1999
Environmental Data Collected	<ul style="list-style-type: none"> • Data on meteorological and oceanographic conditions in the Sound: water temperature; current velocity; salinity; turbidity. • Data on marine water quality: dissolved oxygen; nitrogen; hydrocarbons (surface and sub-surface); chlorophyll; indicator bacteria.
Real Time/Time-Relevant	Meteorological and oceanographic data plus dissolved oxygen measurements are real-time. All other data is time-relevant.
Frequency of Update	Real-time data is collected every fifteen minutes. Nitrogen and hydrocarbon data are updated hourly. Bacteria counts updated weekly.
System Architecture	
Hardware	Pentium PC
Software	Data currently stored as a flat file in an Excel spreadsheet. Database/Web server software yet to be identified.
Web Connectivity/Interface	Web site to be hosted at the University of Connecticut (Avery Point).
Data Management	
Metadata	

Enviromental Data Registry (EDR)	The data elements to be registered include station location, sample time, temperature, salinity, dissolved oxygen, nutrient data, current speed and direction, wind speed and direction, and air temperature. Other potential elements include dissolved hydrocarbons, phytoplankton primary productivity and pathogenic bacteria.
QA/QC	Field and laboratory QC measures described in Quality Assurance Project Plan (QAPP). Routine data of a general nature (e.g., temperature, salinity) will be compared against established parameter ranges and meteorological data recorded by local weather stations, etc. Water quality data (e.g. dissolved oxygen, hydrocarbons, and bacteria) will be gathered over time, analyzed, and interpreted by University of Connecticut scientists and the LIS Project office staff.
Data Security	Public to have read only access. Direct downloading of sensitive water quality data to be password protected and available to designated users.
Data Storage/Archiving	Data to be archived at University of Connecticut (Avery Point).
Secondary Data Users	
Forecasting Capabilities	
Other Communications	Telephone dial-up to environmental data; Public Service Announcements on local radio and television stations; Supplemental written materials like brochures, fact sheets, reports;

Partnerships	EPA Long Island Sound Project Office Univ. of Connecticut - Marine Sciences and Technology Center Connecticut Department of Environmental Protection Save The Sound, Inc. Bridgeport Regional Vocational Aquaculture School The Mystic Marineline Aquarium (New London) The Norwalk Maritime Aquarium (Bridgeport) Spectrogram Corporation
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Ozone Mapping : Sacramento, CA

Primary Contact:**Location:** Sacramento, California**Date Implemented:** May 1997

Element of Success: This project produces not one, but two very effective ways of delivering data to the public: easy-to-understand ‘ozone movies’ on the Web and an e-mail alert system. Also, the project has a well-developed and stringently followed QA/QC plan.

Project Description

Sacramento’s Ozone Mapping Project delivers real-time information about the region’s ozone conditions via the World Wide Web. This ozone information is conveyed online through ‘ozone movies’, animated .gif images, which are updated hourly. They are posted along with an explanation of ozone and actions that the public can take to reduce ozone levels. The project also offers an email alert system (E-Alert) that alerts users via email about current ozone conditions. These two features were developed to supply the public with valuable environmental information that they can use to make daily decisions concerning their health and the environment. The Ozone Mapping Project works in conjunction with the Sacramento ‘Spare The Air’ Program.

Evaluation of Technology

Under contract to the Sacramento Metropolitan Management District, Sonoma Technologies, Inc. (STI), located in Petaluma, CA, operates and maintains the ozone mapping project and its products: ‘ozone movies’ and ozone “still” images. STI also operates the E-alert system. The project utilizes relatively simple technologies, including data loggers, Pentium PCs, a Microsoft Access database, and in-house software. The system is efficient and fully automated. However, staff do ensure quality of the data whenever concerns arise.

Staff have full control over the E-alert system and are informed whenever ozone levels reach predetermined levels. This is necessary to ensure that false warnings are not delivered. Pagers are used to alert staff that the ozone has reached a certain level. Staff members then perform QA checks on the data before distributing the E-alerts and delivery the data to the Web site.

Lessons Learned

- Establish routine, reliable data source(s).
- Develop procedures for missing data (i.e., data gaps). There needs to be precise procedures for dealing with data gaps.
- Develop uniform data formats. This will decrease the time lapse from collection to dissemination.

- Incorporate quality control in all aspects of the system.
- Keep in mind that data can be interpreted many different ways. Also, the method of data communication (in this case, animated maps) can lead to misinterpretation (e.g., transport).

Project Initiator	Sacramento, CA Ozone Mapping Project
Project Description	Ozone Mapping in Sacramento, CA provides 'ozone movies' (animated .gif images), updated hourly, for the Greater Sacramento Region. Also, an email alert system has been developed that allows users to receive email messages whenever ozone levels reach a certain level. Maps are generated daily and posted on the Web.
Status	Operational
Environmental Data Collected	Ozone in ppb; Reported in PSI
Real Time/Time-Relevant	Real Time
Frequency of Update	Every hour, 7 AM to 7 PM, 7 days a week
System Architecture	
Hardware	Pentium PCs Pagers
Software	Access database SmogMap--creation of ozone movies E-Alert--automation of e-alert program
Web Connectivity/Interface	Web site established http://www.sparetheair.com Can access movies, of ozone levels at 20 minute intervals. Can access historic daily ozone movies, plus information on ozone and how to prevent it.
Data Management	
Metadata	
Environmental Data Registry (EDR)	

QA/QC	Initial crude check of data for anomalous values. Human oversight of all data sets.
Data Security	Data values not released to the public
Data Storage/Archiving	Archived at Sonoma Technology, Inc.
Secondary Data Use	
Forecasting Capabilities	Yes, forecast peak ozone values for the current and next day by 11:00 AM. Forecasts made 7 days per week from May through October
Other Communications	E-Alert program; users can sign up to receive instant email messages when the ozone level reaches a certain level.
Partners	Sacramento Metropolitan Air Quality Management District; Yolo-Solano Air Quality Management District; and Placer County Air Pollution Control District
Funding from EPA	Not an EMPACT Project
Funding from Other Sources	Air Districts of Sacramento Region (part of the Spare-the Air Program)

USGS Stream-Gaging Program

Primary Contact: Glenn Patterson, Hydrologist, Office of Water Quality
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Location: USGS Headquarters: Reston, Virginia
Date Implemented: Stream-Gaging Program started in 1953;
 Real-time data delivery began in 1995.

Element of Success: The Stream-Gaging project a great example of how an existing environmental monitoring effort can evolve from one that collects data for regulatory or internal program reasons to one that openly disseminates that data to the public in a user-friendly, time-relevant fashion.

Project Description

The USGS Stream-Gaging Program measures the flow of U.S. rivers and streams through an aggregation of networks and more than 7,000 individual stations nationwide. These streamflow stations provide data in real-time for various agencies to conduct water-resources projects and for the National Weather Service (NWS) to forecast floods. The stream-discharge database is an ever-growing resource for water-resources planning and design, hydrologic research, and operation of water-resources projects.

Stage and discharge of rivers and streams are measured every 15 minutes. By using telemetry, the data is transmitted around the clock, at intervals of either 3 or 4 hours and then are re-transmitted via a domestic satellite. The signal is received by the USGS and posted on the Stream-Gaging web site in real-time.

Evaluation of Technology

The Stream-Gaging Program is a sophisticated project that has built on decades of experience and knowledge to supply a highly demanded product to the public and to other agencies. Complete automation is achieved in all areas, including monitoring, data collection, interpretation, and data dissemination. Satellite telemetry is used for collection. Customized software applications -- *Retrieve* for automated collection of data from monitoring sites, and *Buildreal* for developing the maps and coverages -- are used for interpretation and dissemination of the data.

Lessons Learned

- Do not assume how data will be used. Users may not always use the data the way in which you thought they would.
- Avoid overstepping related private sector research. This may lead to a conflict of interest between your agency and private business.
- Implement uniform data formats.

- Ensure that customer needs and expectations are the driving force behind real-time data delivery.

Project Initiator	US Geological Survey
Project Description	The USGS stream-gaging program is an aggregation of networks and individual streamflow stations that provide data in real-time for various agencies to conduct water-resources projects and for the National Weather Service (NWS) to forecast floods. The stream-discharge database is an ever-growing resource for water-resources planning and design, hydrologic research, and operation of water-resources projects.
Status	Operational
Environmental Data Collected	Stage of stream and stream discharge (ft ³ /sec)
Real Time/Time-Relevant	Real Time
Frequency of Update	Stream stage and discharge are measured at 15 minute intervals. These data are transmitted, via GOES satellite every 3-4 hours and are then made available to the public on the web.
System Architecture	
Hardware	53 Data General, SUN machines on UNIX servers. LINUX machine serving historical data in Reston.
Software	Retrieve (for collecting data from the districts) and Buildreal (for building the point coverages and GIF images)--both in-house developed software.
Web Connectivity/Interface	USGS backbone. Established Web site: http://water.usgs.gov/public/realtime.html User is able to search by geographic area, as well as hydrologic unit, and select any monitoring site within the area.
Data Management	
Metadata	Metadata files accompany all data.

Environmental Data Registry (EDR)	
QA/QC	Real-time water data QA/QC Plan. Regular check of data transmission from field. Regular communication with monitoring station. Data processing software executes error-checking routines of data.
Data Security	Security managed at the district level.
Data Storage/Archiving	Data is archived at the district level in a database called WATSTORE. Historical records are centrally stored on a LINUX machine in Reston (USGS HQ).
Secondary Data Users	Multiple agencies for planning, forecasting, legal concerns, etc. Specifically, stream data is used by the National Weather Service for predicting floods.
Forecasting Capabilities	National Weather Service uses the data, as a secondary user, for forecasting floods.
Other Communications	Yearly Water Report, containing the previous year's stream-gaging data.
Partners	Yearly Water Report, containing the previous year's stream-gaging data. NWIS, NWS, NOAA, several other federal, state, and local partners.